

STUDY ON THE GENUS *PHANEROSERPUS* PSCHORN-WALCHER, 1958 (HYMENOPTERA, PROCTOTRUPIDAE) FROM CHINA

LIU Jing-Xian¹, HE Jun-Hua², XU Zai-Fu^{1*}

1. Department of Entomology, College of Natural Resources and Environment, South China Agricultural University, Guangzhou 510640, China

2. Institute of Insect Sciences, Zhejiang University, Hangzhou 310029, China

Abstract Six species of the genus *Phaneroserphus* Pschorn-Walcher, 1958 from China are recognized and described, including two new species: *P. bui* sp. nov. and *P. nigrithibialis* sp. nov., *P. cristatus* Townes et Townes and *P. punctibasis* Townes et Townes are newly recorded. A key to the Chinese species is given. All type specimens are deposited in the Parasitic Hymenoptera Collection of Zhejiang University, Hangzhou (ZJUH).

Key words Proctotrupinae, Proctotrupini, *Phaneroserphus*, new species, China.

1 Introduction

Phaneroserphus Pschorn-Walcher, 1958 is a small Holarctic and Oriental genus belonging to the tribe Proctotrupini of Proctotrupidae. Only seven species of the genus were previously known in the world including two species from Fujian and Yunnan Provinces of China: *P. brevistigma* Townes et Townes, *P. calcar* (Haliday, 1839), *P. chaoi* Fan et He, *P. cristatus* Townes et Townes, *P. longistigma* Townes et Townes and *P. punctibasis* Townes et Townes and *P. yunnanensis* Fan et He (Townes and Townes, 1981; Fan and He, 1991; Johnson, 1992).

Hosts of most species of the genus are unknown except that *P. calcar* (Haliday, 1839) has been reared from *Quedius* sp. and *Boletochara* sp. of Staphylinidae (Coleoptera) and from *Lithobius forficatus* (Linnaeus, 1758) of Lithobiidae (Scolopendromorpha) (Townes and Townes, 1981).

In the present paper, two new species and two new record species are described and illustrated from China.

2 Material and Methods

Morphological terminology and measurement methods are mainly that of Townes and Townes (1981), however, 'mesosoma' and 'metasoma' are used respectively for 'thorax' and 'abdomen'.

Specimens were examined and observed by using a Leica MZ 12.5 stereomicroscope (Germany). All figures were made by a Leica MZ16 stereomicroscope (Germany) mounted with a digital camera (Q-Imaging, Micropublisher, 3.3 RTV) and were dealt with Leica Image Management Software.

3 Taxonomy

Phaneroserphus Pschorn-Walcher, 1958

Phaneroserphus Pschorn-Walcher, 1958. 31: 62. Type species: *Proctotrupes calcar* Haliday. Original designation.

Diagnosis. Fore wing length 2.2 – 3.8 mm. Mandible with one apical tooth. Maxillary palpus with four segments. Front of head with a strong median vertical ridge between antennal sockets and on lower part of frons. Lateral aspect of pronotum smooth. Propodeum reticulately wrinkled, always with a median longitudinal carina (this carina absent or indistinct in Oriental species: *P. yunnanensis* Fan et He, 1991 and *P. chaoi* Fan et He, 1991). Longer spur of hind tibia of male 0.64 – 0.77 times as long as hind basitarsus, of female 0.47 – 0.53 times as long as hind basitarsus. Tarsal claw simple. Costal margin of radial cell 0.70 – 1.55 times as long as width of stigma. Lower half of syntergite without hairs. Ovipositor sheath 0.25 – 0.35 times as long as hind tibia, with sparse punctures, weakly decurved and tapered to a point.

Biology. Parasite on Staphylinidae or Lithobiidae.

Distribution. Oriental and Holarctic Regions.

Key to species of the genus *Phaneroserphus* Pschorn-Walcher from China.

1. Male 2
Female 5
2. Ridges between antennal sockets without a secondary ridge 3
Ridges between antennal sockets with a secondary ridge 4
3. Propodeum (Figs 7–8) with median longitudinal carina strong and long; base of syntergite (Fig. 8) with one lateral groove on each side. Hubei *P. bui* sp. nov.
Propodeum with median longitudinal carina absent or indistinct; base of syntergite with two lateral grooves on each side. Fujian
..... *P. chaoi* Fan et He, 1991

The study was supported by National Natural Science Foundation of China (30370173, 30499341).

* Corresponding author, E-mail: xuzai fu@scau.edu.cn

Received 18 Aug. 2010, accepted 29 Mar. 2011.

4. Second flagellomere (Fig. 9) 3.7 times as long as wide; base of syntergite (Fig. 14) with median groove reaching to 0.55 the distance between first thyridia. Jilin; Japan *P. cristatus* Townes et Townes, 1981
Second flagellomere (Fig. 15) 3.3 times as long as wide; base of syntergite (Fig. 20) with median groove reaching to 0.95 the distance between first thyridia. Guizhou *P. nigritibialis* sp. nov.
5. Propodeum (Figs 25–26) with median longitudinal carina strong, smooth area on base of dorsal face short. Fujian; Japan *P. punctibasis* Townes et Townes, 1981
Propodeum without median longitudinal carina, smooth area on base of dorsal face longer 6
6. Upper side of stalk with eight transverse wrinkles; base of syntergite with three lateral grooves on each side. Yunnan *P. yunnanensis* Fan et He, 1991
Upper side of stalk with reticulate wrinkles; base of syntergite with two lateral grooves on each side. Fujian *P. chaoi* Fan et He, 1991

***Phaneroserphus bui* sp. nov.** (Figs 1–8)

Description. Male. Body length 3.4 mm, fore wing length 2.8 mm.

Head. Head in lateral view projection forward from eye by 0.46 times the length of eye. Temple in dorsal view 0.52 times as long as eye. Ridge between antennal sockets moderately high, without secondary ridges. Second and tenth flagellomeres (Fig. 1) 3.4 and 4.4 times as long as wide, respectively; apical flagellomere 1.26 times as long as the subapical one. Each flagellomere with a linear-like tyloid.

Mesosoma. Side of pronotum smooth, along anterior margin of pronotum finely striate. Anterior edge of mesopleuron with hairs above its horizontal groove and below tegula, hairless area in between 1.2 the length of stigma. Metapleuron (Fig. 7) reticulately rugose, with a triangular smooth area on anterior upper part, 0.33 times as long and 0.5 as high as metapleuron. Propodeum (Figs 7–8) with median longitudinal carina reaching to base of hind face; dorsal face of propodeum mostly reticulately rugose, with a pair of small smooth areas on base that 1.0 times the length between base and spiracle; hind face and pleural area reticulately rugose.

Legs (Figs 4–6). Hind femur 4.4 times as long as wide; longer spur of hind tibia curved, 0.64 times as long as hind basitarsus.

Wings. Fore wing (Fig. 2) 2.3 times as long as wide. Stigma and costal vein of fore wing 2.0 and 1.2 times as long as width of stigma, respectively. First part of radius raised from the middle of stigma, 2.5 times as long as wide, second part of radius almost straight.

Metasoma. Metasomal stalk (Fig. 8) in dorsal view 1.3 times as long as apical width, with basal half reticulately rugose and six longitudinal carinae on apical half. Metasomal stalk (Fig. 7) in lateral view 1.1 times as long as high, with basal half reticulately rugose, below which with three transverse ridges; apical half with four longitudinal ridges. Base of

syntergite (Fig. 8) with median groove reaching 0.85 the distance to the first thyridia, each side with one lateral groove that 0.4 times the length of median groove. First thyridia 2.5 times as wide as long, separated from each other by 0.5 times the width of one thyridium. Lower part of syntergite hairless. Clasper 3.5 times as long as its basal width.

Colour. Body black, apical part of metasoma tinged with brown. Antenna blackish brown, with scape and pedicel brownish yellow. Labrum and mandible yellow. Tegula brownish yellow. Legs brownish yellow, coxa blackish brown, femur excluding base light brown, apical half of tibia light brown, hind leg dark and blackish brown. Wings hyaline, stigma and strong veins dark brownish yellow, weak veins yellowish brown.

Female. Unknown.

Holotype ♂, China, Houhe Nature Reserve (30.03° N, 110.5° E), Wufeng County, Hubei Province, 11 July 1999, BU Wen-Jun, No. 200104512.

Distribution. China (Hubei).

Comments. The species is similar to *P. cristatus* Townes et Townes, 1981, but differs from the latter in the ridge between antennal sockets without a secondary ridge (with a secondary ridge in *P. cristatus*) and head in lateral view projection forward from eye by 0.46 the length of eye (0.60 the length of eye in *P. cristatus*). The species is also different from *P. calcar* (Haliday, 1839) in having the upper side of stalk reticulate rugose on basal half (with two transverse wrinkles and a few punctures on basal 0.35 in *P. calcar*) and base of syntergite with only one lateral groove on each side (with two or three lateral grooves in *P. calcar*).

Etymology. The species is named after the collector Dr. BU Wen-Jun.

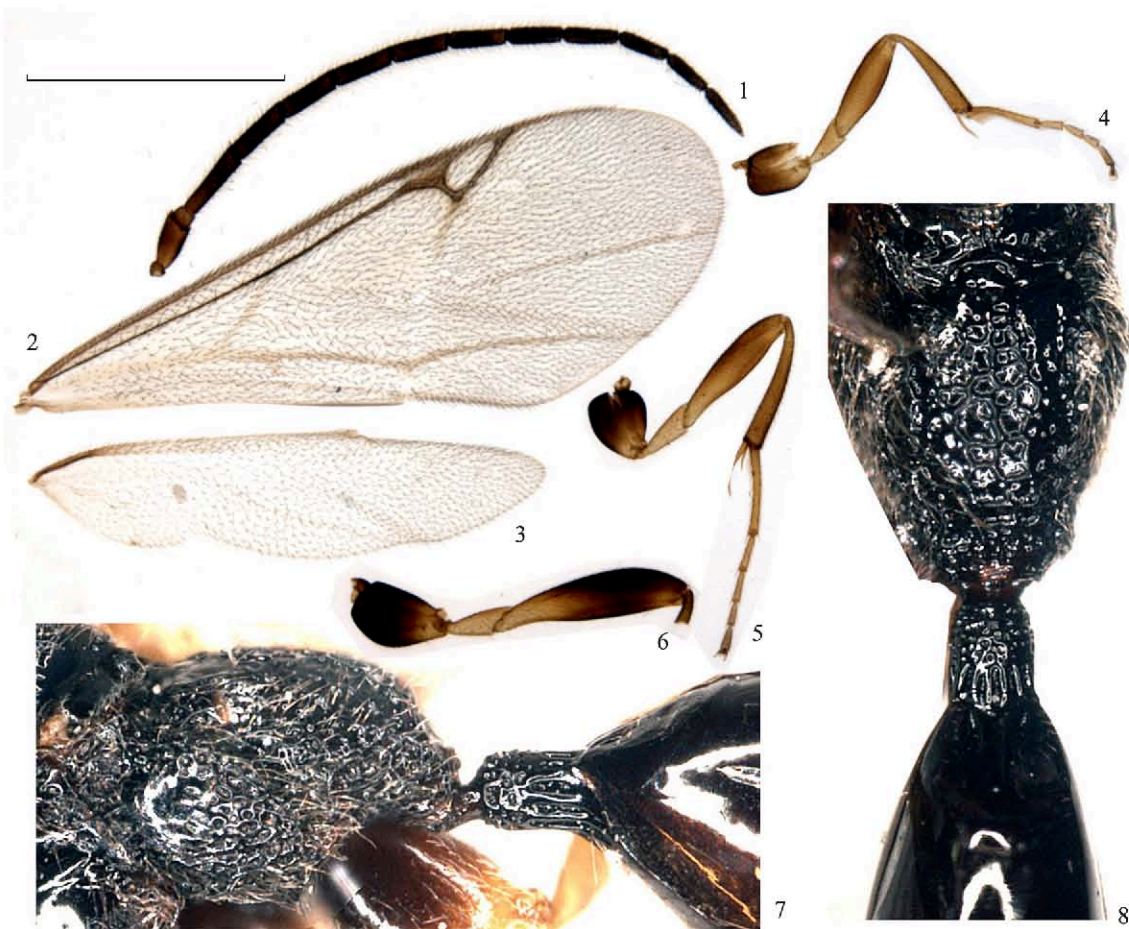
***Phaneroserphus chaoi* Fan et He, 1991**

Phaneroserphus chaoi Fan et He, 1991: 64.

Materials examined. 1 ♀, China, Mt. Huanggang (27.8° N, 117.7° E), Fujian Province, 14 Aug. 1985, ZHENG Geng (holotype); 1 ♂, China, Mt. Huanggang, Fujian Province, 1 Aug. 1985, HUANG Dong-Hong (allotype); 2 ♀ ♀, China, Mt. Huanggang, Fujian Province, 28 July 1984, HUANG Ju-Chang; 1 ♀, 1 ♂, China, Mt. Huanggang, Fujian Province, 6–30 July 1985, CHEN Xue-Xin and LIU Ming-Hui; 2 ♀ ♀, China, Guadun, Mt. Wuyi (26.4° N, 116.4° E), Fujian Province, 1–25 July 1985, HUANG Dong-Hong.

Distribution. China (Fujian).

Comments. This species is similar to *P. yunnanensis* Fan et He in having the ridge between antennal sockets without a secondary ridge and the propodeum without median longitudinal carina, but it is different from the latter in having upper side of stalk



Figs 1 – 8. *Phaneroserphus bui* sp. nov. 1. Antenna. 2. Fore wing. 3. Hind wing. 4. Fore leg. 5. Middle leg. 6. Hind coxa, trochanter and femur. 7. Metapleuron, propodeum and base of metasoma, lateral view. 8. Propodeum and base of metasoma, dorsal view. Scale bar = 1 mm.

reticulate rugose (with eight transverse wrinkles in *P. yunnanensis*) and base of syntergite with two lateral grooves (with three lateral grooves in *P. yunnanensis*).

***Phaneroserphus cristatus* Townes et Townes, 1981**

New to China (Figs 9 – 14)

Phaneroserphus cristatus Townes et Townes, 1981: 201.

Description. Male. Body length 3.6 mm, fore wing length 3.4 mm.

Head. Head in lateral view projection forward from eye by 0.6 the length of eye. Temple in dorsal view 0.46 times as long as eye. Ridge between antennal sockets moderately high, its dorsal margin angled, with a weak secondary ridge at end, finely reticulately rugose on upper and lower ends, in lateral view the ridge with 3 – 4 fine wrinkles that parallel the dorsal margin of ridge. Second and tenth flagellomeres (Fig. 9) 3.7 and 5.0 times as long as wide, respectively; apical segment 1.17 times as long as the subapical one. Eighth to tenth flagellomeres each with a tyloid that composed by 10 small tubercles on basal 0.1 to 0.7 of respective flagellomere.

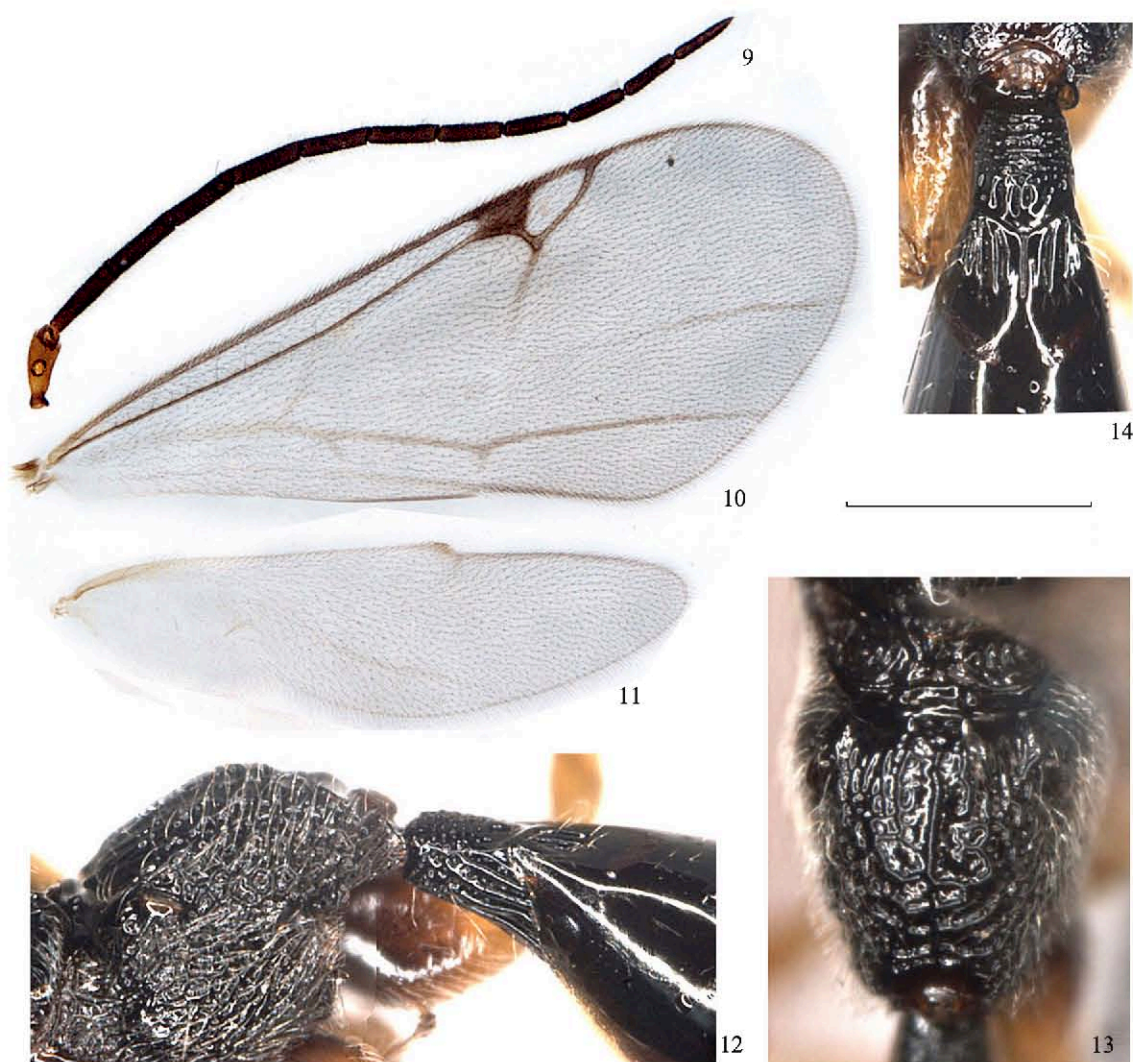
Mesosoma. Mesopleuron smooth, with sparse hairs below tegula, above speculum and along sternite

of mesopleuron. Upper part of horizontal groove with some weak wrinkles on anterior middle and posterior lower corner. Metapleuron (Fig. 12) mostly with areolet-reticulate wrinkles, small smooth area on anterior part about 0.1 times as long and 0.25 times as high as that of metapleuron, respectively. Propodeum (Fig. 13) reticulately rugose, median longitudinal carina reaching to the middle of hind face; dorsal face of propodeum with a pair of small smooth areas on base, 0.5 times the length between base and spiracle, behind the smooth area with 3 – 4 longitudinal striae that with areolets inside.

Legs. Hind femur 4.58 times as long as wide. Longer spur of hind tibia 0.7 times as long as hind basitarsus.

Wings (Figs 10 – 11). Fore wing 2.16 times as long as wide. Stigma and costal margin of radial cell 1.6 and 1.2 times as long as width of stigma, respectively. First part of radius incline, 2.0 times as long as wide.

Metasoma. Metasomal stalk (Fig. 14) in dorsal view 1.25 times as long as wide, weakly narrowed to base, basal 0.8 with punctato-transverse wrinkles, and apical 0.2 smooth and weakly depressed. Stalk (Fig.



Figs 9 – 14. *P. cristatus* Townes et Townes. 9. Antenna. 10. Fore wing. 11. Hind wing. 12. Metapleuron, propodeum and base of metasoma, lateral view. 13. Propodeum, dorsal view. 14. Base of metasoma, dorsal view. Scale bar = 1 mm.

12) in lateral view 1.0 times as long as high, with three weak transverse wrinkles on basal 0.2, and with four longitudinal ridges on apical 0.8. Base of syntergite (Fig. 14) with median groove reaching 0.55 the distance to the first thyridia, each side with three lateral grooves, sublateral groove 0.8 times as the length of median groove. First thyridia 3.5 as wide as long, separated from each other by 0.7 times the width of one thyridium.

Colour. Body black. Antenna blackish brown with scape and pedicle yellowish brown. Palpus yellow. Labrum, mandibles, tegula and apex of clasper yellowish brown. Legs yellowish brown, both of base of middle and hind coxae, dorsal margin of hind femur, apex of hind tibia and apical tarsomeres of all legs blackish brown. Wings hyaline, stigma and strong veins light brown.

Female. Unknown.

Materials examined. 1 ♂, China, Erdaobaihe Town (42.41°N, 128.11°E), Mt. Changbai, Jilin

Province, 2 Aug. 2004, MA Yun, No. 20047151.

Distribution. China (Jilin); Japan.

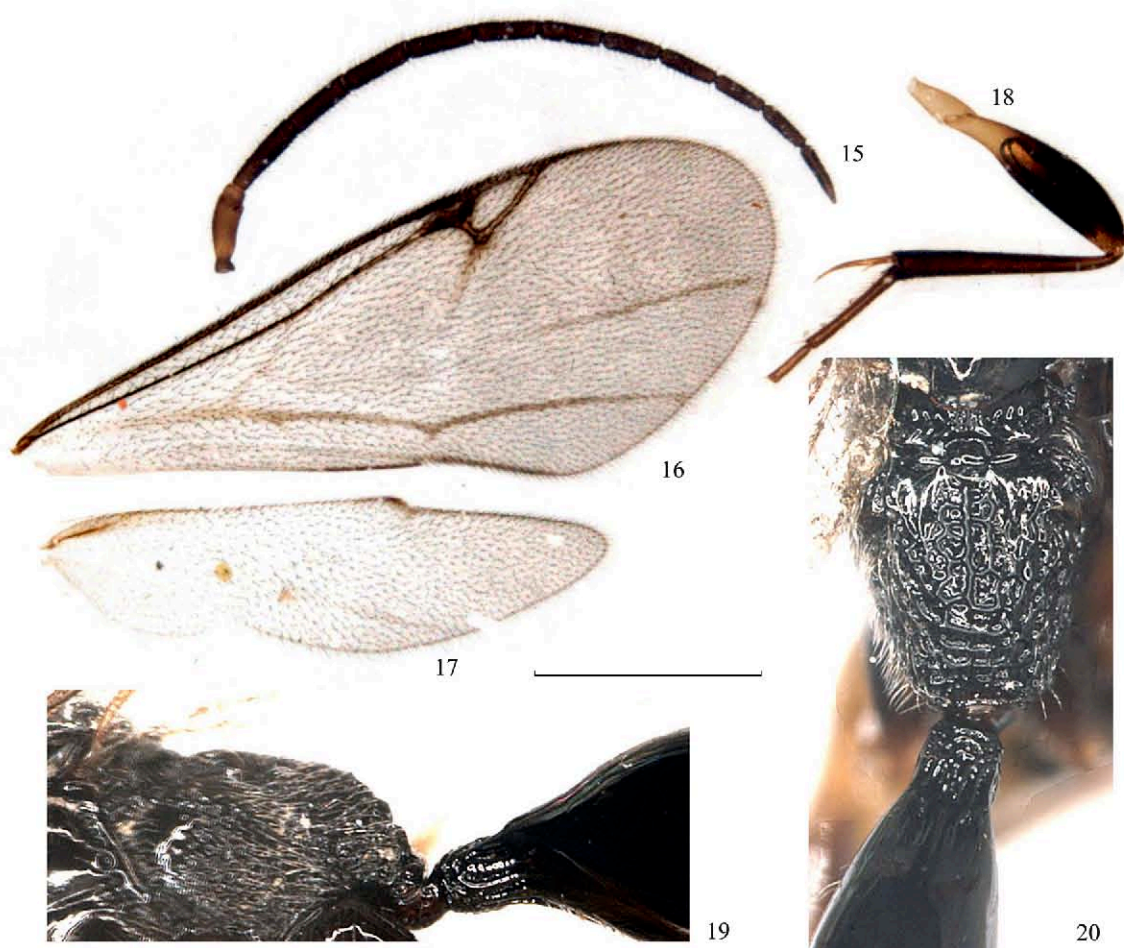
Comments. Base of syntergite with three lateral grooves in Chinese specimen, while the original description of *P. cristatus* Townes et Townes with one or two lateral grooves.

***Phaneroserphus nigrithibialis* sp. nov.** (Figs 15 – 20)

Description. Male. Body length 3.3 mm, fore wing length 2.7 mm.

Head. Head in lateral view projection forward from eye 0.6 the length of eye. Temple in dorsal view 0.6 times as long as eye. Ridge between antennal sockets high, dorsal margin not angled, with a secondary ridge that forked at end, in lateral view with two weak wrinkles parallel to the dorsal margin. Second and tenth flagellomeres (Fig. 15) 3.3 and 5.1 times as long as wide, respectively; apical segment 1.2 times as long as the subapical one.

Mesosoma. Mesopleuron smooth, with hairs



Figs 15 – 20. *P. nigritibialis* sp. nov. 15. Antenna. 16. Fore wing. 17. Hind wing. 18. Hind leg. 19. Metapleuron, propodeum and base of metasoma, lateral view. 20. Propodeum and base of metasoma, dorsal view. Scale bar = 1 mm.

below tegula, above speculum and below its horizontal groove. Metapleuron with punctato-reticulate wrinkles, smooth area on anterior 0.28 as long and 0.5 as high as that of metapleuron (Fig. 19). Propodeum (Figs 19 – 20) reticulately rugose, median longitudinal carina reaching to the middle of hind face; dorsal face with a pair of smooth areas 1.0 times the length between base and spiracle, and with a row of longitudinal wrinkles behind the smooth areas.

Wings (Figs 16 – 17). Fore wing (Fig. 16) 4.3 times as long as wide, stigma and costal margin of radial cell each 1.5 and 1.55 times as long as width of stigma; first part of radius inclivous, 2.0 times as long as wide.

Legs. Hind femur (Fig. 18) 4.3 times as long as wide; longer spur of hind tibia 0.7 times as long as hind basitarsus.

Metasoma. Metasomal stalk (Fig. 20) in dorsal view 1.5 times as long as wide, punctato-rugulose on basal half and with five longitudinal wrinkles on apical half. Stalk (Fig. 19) in lateral view with dorsal margin 1.2 times as long as high, with two transverse wrinkles on basal 0.2 and five strong longitudinal

wrinkles behind. Base of syntergite (Figs 19 – 20) with median groove reaching 0.95 the distance to first thyridia, each side with two lateral grooves, 0.4 times the length of median groove. First thyridia 3.2 times as wide as long, separated from each other by 0.6 times the width of one thyridium.

Colour. Body black. Antenna blackish brown with scape and pedicle reddish brown. Labrum and apex of mandibles reddish brown. Tegula yellowish brown. Fore leg yellowish brown, coxa blackish brown except for apex. Hind coxa (except for its apex blackish brown), femur excluding basal 0.3, tibia and basitarsus black, second to fifth tarsomeres brown, the rest yellowish brown. Wing hyaline, tinged with fuscous, stigma and strong veins light blackish brown, weak veins yellow.

Holotype ♂, China, Dashahe Nature Reserve, Daozhen County (28.86° N, 107.60° E), Guizhou Province, 20 Aug. 2004, WEI Shu-Jun, No. 20047392.

Distribution. China (Guizhou).

Comments. The species resembles *P. cristatus* Townes *et* Townes, but it can be distinguished from the latter by having the base of syntergite with median

groove reaching 0.95 the distance to first thyridia (0.55 in *P. cristatus*) and upper side of stalk reticulate rugose on basal half (with four transverse wrinkles in *P. cristatus*).

Etymology. The specific name derived from the Latin adjective '*nigri*' + '*tibia*', meaning the black hind tibia.

***Phaneroserphus punctibasis* Townes et Townes, 1981
New to China (Figs 21 – 26)**

Phaneroserphus punctibasis Townes et Townes, 1981: 202.

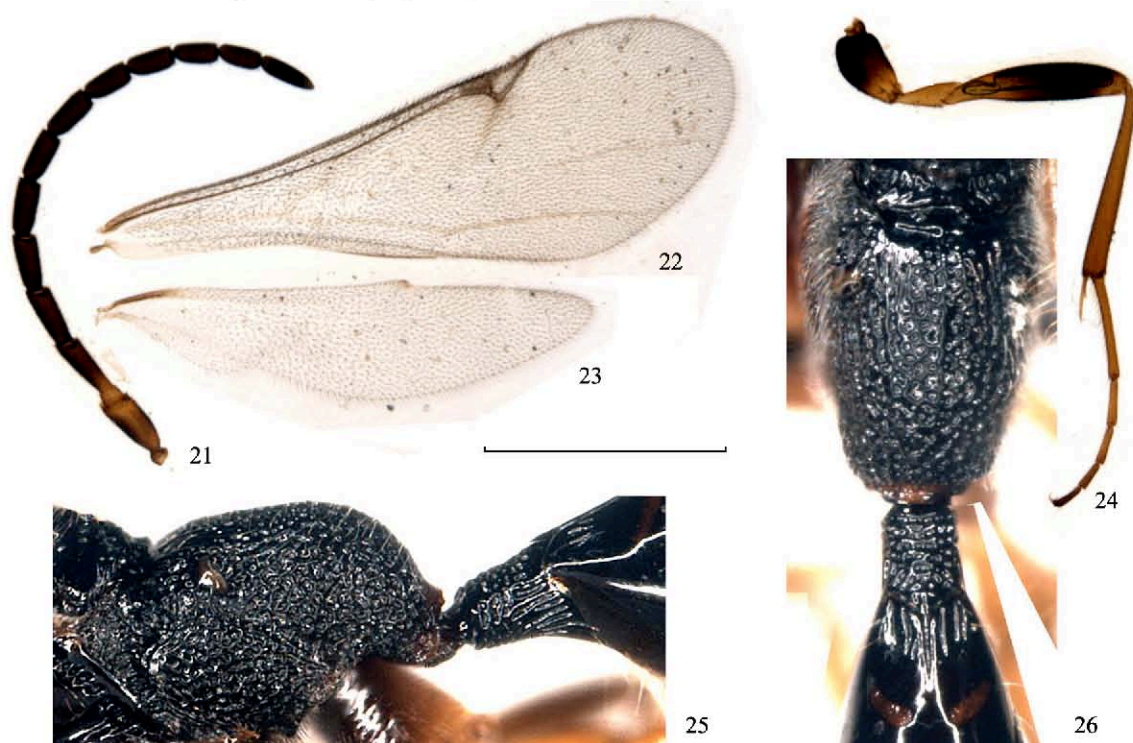
Description. Female. Body length 3.4 mm, fore wing length 2.65 mm.

Head. Head in lateral view projection forward from eye by 0.95 the length of eye. Temple in dorsal view 0.89 times as long as eye. Ridge between antennal sockets moderately high, without a secondary ridge. Second and tenth flagellomeres (Fig. 21) 2.67

and 2.4 times as long as wide, respectively; apical segment 1.35 times as long as subapical one.

Mesosoma. Side of pronotum smooth, with some parallel weak wrinkles along its anterior edge. Mesopleuron with hairs above horizontal groove and below tegula, hairless area in between 1.5 the length of stigma. Metapleuron (Fig. 25) entirely punctat-rugulose, without smooth area. Propodeum (Fig. 26) convex, median longitudinal carina fine and reaching to apex of hind face; dorsal face densely reticulately rugose, with a pair of small smooth areas near base; inner side of spiracle with a few fine longitudinal wrinkles; hind face and pleural area reticulately rugose.

Legs. Hind femur (Fig. 24) 4.95 times as long as wide; longer spur of hind tibia 0.53 times as long as hind basitarsus.



Figs 21 – 26. *P. punctibasis* Townes et Townes. 21. Antenna. 22. Fore wing. 23. Hind wing. 24. Hind leg. 25. Metapleuron, propodeum and base of metasoma, lateral view. 26. Propodeum and base of metasoma, dorsal view. Scale bar = 1 mm.

Wings (Figs 22 – 23). Fore wing (Fig. 23) 2.5 times as long as wide. Stigma and costal margin of radial cell 2.1 and 1.5 times as long as width of stigma, respectively. First part of radius raising weakly distad of the middle of stigma, 1.6 times as long as wide; second part of radius straight, meeting the first part without stub.

Metasoma. Metasomal stalk (Fig. 26) in dorsal view 1.3 times as long as wide, entirely with reticulate transverse wrinkles. Stalk (Fig. 25) in lateral view with its dorsal margin 1.0 times as long as high, with

three transverse wrinkles on base and with eight longitudinal ridges on apex. Base of syntergite (Fig. 26) with median groove reaching 0.85 the distance to first thyridia, each side with 3 lateral grooves, sublateral groove 0.6 the length of median groove. First thyridia 2.8 times as wide as long, separated from each other by 0.6 the width of one thyridium. Lower part of syntergite bare. Ovipositor sheath 0.25 times as long as hind tibia, 2.9 times as long as its median width, smooth and sparsely punctate.

Colour. Body black. Antenna blackish brown;

ends of scape, pedicel and base of first flagellomere yellowish brown. Mouth part yellow. Tegula brownish yellow. Lower edge of lateral side of pronotum tinged with brown. Fore and middle legs brownish yellow; hind leg yellowish brown, basal half of coxa and femur (excluding its basal half and apex) blackish. Wings hyaline, stigma and strong veins light brown, weak veins not pigmented. Ovipositor sheath with apical end brownish yellow.

Male. Unknown.

Materials examined. 1 ♀, China, Xiongjiang Town, Minqing County (26.22° N, 118.85° E), Fujian Province, 13 - 17 July 2005, XU Zai-Fu, No. 20069419.

Distribution. China (Fujian); Japan.

Comments. The specimen from China with upper side of stalk reticulate rugose otherwise matches with *P. punctibasis* Townes et Townes from Japan.

Phaneroserphus yunnanensis Fan et He, 1991

Phaneroserphus yunnanensis Fan et He, 1991: 63.

Materials examined. 1 ♀, China, Kunming (25°N, 102.7°E), Yunnan Province, 18 May 1981,

HE Jun-Hua (holotype).

Distribution. China (Yunnan).

Comments. This species can be easily distinguished from its congeners by having the propodeum without median longitudinal carina, dorsal face largely smooth and upper side of stalk with eight transverse wrinkles.

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中国脊额细蜂属分类研究 (膜翅目, 细蜂科)

刘经贤¹ 何俊华² 许再福^{1*}

1. 华南农业大学资源环境学院昆虫学系 广州 510640

2. 浙江大学华家池校区昆虫科学研究所 杭州 310029

摘要 记述了我国脊额细蜂属 6 种, 其中 2 新种: 卜氏脊额细蜂 *P. bui* sp. nov. 和黑胫脊额细蜂 *P. nigrifemoralis* sp. nov.; 2 新纪录种: 冠脊额细蜂 *P. cristatus* Townes et Townes 和点柄脊额细蜂 *P. punctibasis* Townes et Townes; 新种和新纪录种均附有详细特征图, 并编制了我国脊额细蜂属分种检索表。模式标本保存于浙江大学膜翅目寄生蜂标本馆 (ZJUH)。

卜氏脊额细蜂, 新种 *Phaneroserphus bui* sp. nov. (图 1~8)

鉴别特征 新种与冠脊额细蜂 *P. cristatus* Townes et Townes, 1981 较为相似, 可以从以下特征与后者区别: 1) 触角窝之间中竖脊无次生脊 (后者有明显的次生脊); 2) 头部侧面观中竖脊长为复眼的 0.46 倍 (后者为 0.60 倍)。从腹柄背面基半具网皱、合腹背板基部两侧具 1 条侧纵沟可以与变脊额细蜂 *P. calcar* (Haliday, 1839) 区别 (后者腹柄基部 0.35 出具 2 条横纵脊和一些刻点、合腹板基部中纵沟两侧各具具 2~3 条侧纵沟)。

正模 ♂, 湖北五峰后河保护区, 1999-07-11, 卜文俊采, No. 200104512。

分布: 湖北。

词源: 种名以采集人卜文俊教授姓氏命名。

冠脊额细蜂 *Phaneroserphus cristatus* Townes et Townes, 1981

中国新纪录 (图 9~14)

研究标本: 1 ♂, 吉林长白山二道白河电站, 2004-08-02, 马云采, No. 20047151。

分布: 吉林; 日本。

黑胫脊额细蜂, 新种 *Phaneroserphus nigrifemoralis* sp. nov.

(图 15~20)

鉴别特征 本种与冠脊额细蜂 *P. cristatus* Townes et Townes 相似, 但可以从以下特征与之区别: 1) 合腹背板中纵沟伸达合背板基部至第 1 对宽疤间距的 0.95 处 (后者为 0.55); 2) 腹柄背面具网皱 (后者为 4 条横皱)。

正模 ♂, 贵州道真大沙河, 2004-08-20, 魏书军采, No. 20047392。

分布: 贵州。

词源: 种名意指后足胫节黑色。

点柄脊额细蜂 *P. punctibasis* Townes et Townes, 1981 中国

新纪录 (图 21~26)

研究标本: 1 ♀, 福建闽清雄江镇, 2005-07-13~17, 许再福采, No. 20069419。

分布: 福建; 日本。

关键词 细蜂亚科, 细蜂族, 脊额细蜂属, 新种, 中国。

中图分类号 Q969.548.1

* 通讯作者, E-mail: xuzai fu@scau.edu.cn